

CLAIMS

WE CLAIM:

1. In a motor drive providing a controller converting command signals to inverter-input signals received by an inverter to produce three-phase motor drive signals, an improvement comprising:

5 a voltage feedback loop acquiring voltage feedback signals measuring the voltage of the three-phase motor drive signals and providing the voltage feedback signals to the controller to correct the inverter-input signals to adjust the voltage of the three-phase motor drive signals to conform with the inverter input signals.

2. The motor drive of claim 1 wherein the controller includes control logic receiving the command signals to produce the inverter input signals as a vector described by a q-component and a d-component, the vector received by a first transform means converting the vector to the three-phase sinusoidal signals, wherein 5 the voltage feedback loop includes a second transform means converting the voltage feedback signals to a feedback q-component and a feedback d-component and summers subtracting the feedback q-component from the q-component and subtracting the feedback d-component from the d-component, prior to the q-component and d-component being received by the first transform means.

3. The motor drive of claim 2 wherein the voltage feedback loop further includes a proportional-integral controller positioned between the summers and the first transform means for modifying the received q-component and d-component by an integral and proportional factor.

4. The motor drive of claim 1 wherein the three-phase motor drive signals are switched voltage signals and wherein the voltage feedback loop includes a sampler, sampling the three-phase motor drive signals and combining successive samples to produce sinusoidal waveforms.

5. The motor drive of claim 1 wherein the inverter is a switched output amplifier.

6. The motor drive of claim 5 wherein an output stage of the inverter uses insulated gate bipolar transistors.

7. The motor drive of claim 1 further including a current feedback loop acquiring current feedback signals from the three-phase motor drive signals and providing the current feedback signals to the controller to correct the inverter-input signals to adjust the current of the three-phase motor drive signals to better conform
5 with the inverter input signals.

8. The motor drive of claim 7 wherein the controller includes control logic receiving the command signals to produce the inverter input signals as a vector described by a q-component and a d-component, the vector received by a first transform means converting the vector to three-phase sinusoidal signals, wherein the
5 current feedback loop includes a second transform means converting the feedback current signals to a feedback q-component and a feedback d-component and a summer subtracting the feedback q-component from the q-component and subtracting the feedback d-component from the d-component, prior to the q-component and d-component being received by the first transform means.

9. The motor drive of claim 8 wherein the current feedback loop further includes a proportional-integral controller positioned between the summers and the first transform means for modifying the q-component and d-component by an integral and proportional factor.

10. The motor drive of claim 9 wherein the voltage feedback loop includes a transform means converting the feedback voltage signals to a feedback q-component and a feedback d-component and a summer subtracting the feedback q-component from the q-component and subtracting the feedback d-component from the d-
5 component, prior to the q-component and d-component being received by the first transform means and wherein the voltage feedback loop further includes a second proportional-integral controller positioned between the summers and the transform means for modifying the q-component and d-component by an integral and proportional factor.

11. The motor drive of claim 2 further including a command feedback loop accepting command feedback signals from a feedback sensor physically communicating with a motor receiving the three-phase motor drive signals and providing the command feedback signals to the controller to adjust the operation of
5 the motor to better conform to the command signal, wherein the feedback signals from the feedback sensor are selected from the group consisting of: motor speed, motor torque, and motor position.

12. A method of controlling a motor using a motor drive having a controller converting command signals to inverter-input signals received by an inverter to produce three-phase motor drive signals, comprising the steps of:

- (a) measuring the voltage of the three-phase motor drive signals to produce
5 voltage feedback signals; and
- (b) providing the voltage feedback signals to the controller to correct the inverter-input signals to adjust the voltage of the three-phase motor drive signals to conform with the inverter input signals.

13. The method of claim 11 further including the steps of:
producing the inverter input signals as a vector described by a q-component and a d-component;
transforming the voltage feedback signals to a feedback q-component and a
5 feedback d-component; and
subtracting the feedback q-component from the q-component and subtracting the feedback d-component from the d-component, prior to the q-component and d-component to correct the inverter input signals.

14. The method of claim 13 further including the step of modifying the received q-component and d-component by an integral and proportional factor.

15. The method of claim 11 wherein the three-phase motor drive signals are switched voltage signals and including the step of sampling the three-phase motor drive signals and combining successive samples to produce sinusoidal waveforms.

16. The method of claim 11 further including the steps of:
acquiring current feedback signals from the three-phase motor drive signals;
and

5 providing the current feedback signals to the controller to correct the
inverter-input signals to adjust the current of the three-phase motor drive signals to
better conform with the inverter input signals.

17. The method of claim 16 further including the steps of:
producing the inverter input signals as a vector described by a q-component
and a d-component;
transforming the feedback current signals to a feedback q-component and a
5 feedback d-component; and
subtracting the feedback q-component from the q-component and subtracting
the feedback d-component from the d-component, to correct the inverter input
signals.

18. The method of claim 17 further including the step of modifying the q-
component and d-component by an integral and proportional factor.

19. The method of claim 18 further including the steps of:
converting the feedback voltage signals to a feedback q-component and a
feedback d-component;
subtracting the feedback q-component from the q-component and subtracting
5 the feedback d-component from the d-component; and
modifying the q-component and d-component by an integral and proportional
factor.

20. The method of claim 19 further including the steps of:
acquiring command feedback signals from a feedback sensor physically
communicating with a motor receiving the three-phase motor drive signals; and
5 providing the command feedback signals to the controller to adjust the
operation of the motor to better conform to the command signal,

wherein the feedback signals from the feedback sensor are selected from the group consisting of: motor speed, motor torque, and motor position.